

The Lake Mason National Wildlife Refuge (LMWR) was sampled with pitfall traps during the mid to late sage-grouse brooding period during 2014 and 2015. Arthropods were identified to Family with a total of 7,730 specimens collected on the refuge thus far. Sweep net samples taken in 2013 and 2014 are still being processed.

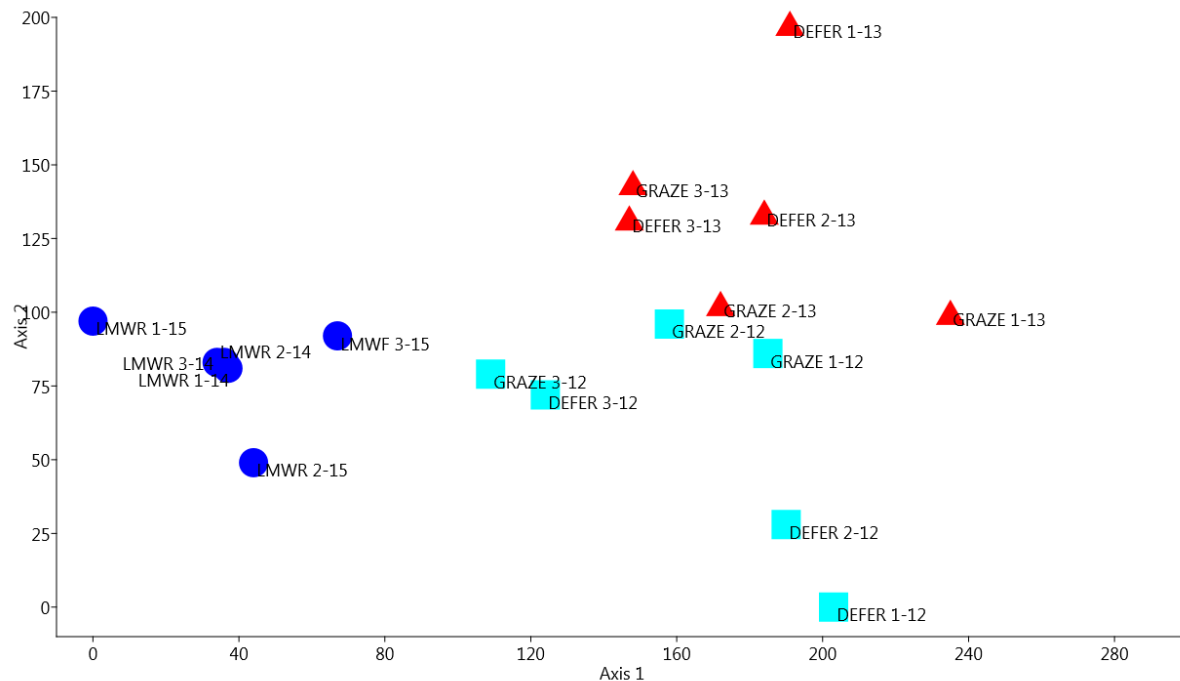
A Simpson's (1-D) diversity index was calculated for the LMWR and compared against diversities associated with Sage-Grouse Initiative (SGI) pastures which were either 'Grazed' or 'Deferred' during the sage-grouse early brooding time period. The Simpson's (1-D) index ranges from 0 – 1 and represents the probability that two individuals randomly selected from a sample will belong to different Families. The closer the number is to 1, the more diverse the sample. Comparisons were calculated using a Diversity Permutation test which compares the diversities using random permutations and provides a *p-value* representing the probability that the diversities are statistically similar. Results are presented in Table 1.

**Table 1. Simpson's 1-D diversity indices for the Lake Mason National Wildlife Refuge (LMWR) and Sage-Grouse Initiative Grazed and Deferred pastures with Diversity Permutation *p-values* which indicate the probability that the diversity values within the same row are statistically similar.**

LMWR	Grazed	Deferred	<i>p-value</i>
0.86	0.89	---	<0.01
0.86	---	0.88	<0.01
---	0.89	0.88	<0.01

Additionally, a Detrended Correspondence Analysis (DCA) was performed to elucidate any influence various land management practices may have on the structure of the invertebrate community. DCA is a weighted-average technique that reciprocally double-transforms and detrends non-linear community data to produce 'corresponding' sampling unit ordination. Results of this technique indicate that the arthropod community structure differs both spatially and temporally across sampling location and year (Fig. 1).

Sampling at the LMWR recorded little temporal variation suggesting that the arthropod community was composed of similar Families in similar abundances during both sampling years; however the LMWR (blue circles) over sampling year has a distinct spatial community structure when compared to the SGI Grazed and Deferred pastures (non-blue circles). Within the SGI system, the most notable distinction is temporal variation between sampling years (light blue squares vs. red triangles) with minimal grouping being displayed spatially either within or across year. Further analyses of these data are forthcoming and will continue to elucidate the influences of dominant land uses practices, such as livestock grazing or long-term rest, on the abundance and community structure of rangeland arthropods in central Montana.



**Figure 1. Detrended Correspondence Analysis of Lake Mason National Wildlife Refuge (LMWR) and Sage-Grouse Initiative (SGI) pastures where livestock were either present (Graze) or absent (Defer) during the sage-grouse early brooding period. Numbers following letter designations represent the sampling location and year, respectively. Blue circles represent samples taken on the LMWR during 2014 and 2015. Light blue squares represent samples taken during 2012 on SGI Graze and Defer pastures. Red triangles represent SGI Graze and Defer pastures during 2013. Spatially, the community structure of the LMWR is distinct from that sampled on SGI pastures (blue circles vs. non-blue circles); however, temporally this location displays much similarity suggesting that the arthropod community structure and abundances were similar over both sampling years. Within the SGI system, there is some indication of spatial similarity among grazed and rested pastures; however, the strongest ecological separation is evident between years regardless of pasture designation (light blue squares vs. red triangles).**